

REMARKS

Claims 11-19 were previously pending. New claims 20 and 21 have been added. These new claims are supported at least by the disclosures in page 11, paragraph [0027]. Claim 11 has been amended. The amendments are supported at least by the disclosures in pages 4-5, paragraph [0009]. Claim 14 has been amended to correct a typographical error. The amendments are supported at least by the disclosures in pages 8-9, paragraph [0021]. Applicants respectfully submit that no new matters have been introduced. Claims 11-21 will be pending upon entry of the amendments.

Claim Rejections -- 35 U.S.C. 103

I. Applicants respectfully traverse the obviousness rejections under 35 U.S.C. 103(a) of claims 11-12 and 15-19 over Kawasaki et al (US 5,843,243).

Claim 11 recites a wear-resistant copper-based alloy, comprising, by weight, 4.7 to 22.0% nickel, 0.5 to 5.0% silicon, 2.7 to 22.0% iron, 1.0 to 15.0% chromium, 0.01 to 1.97% cobalt, 2.7 to 22.0% tantalum and/or hafnium, and the balance of copper with inevitable impurities.

Kawasaki discloses a wear-resistant copper-based alloy comprising 10.0 to 30.0% by weight Ni, 0.5 to 5.0% by weight Si, 2.0 to 15.0% by weight Fe, 1.0 to 10.0% by weight Cr, 2.0 to 15.0% by weight Co, 2.0 to 15.0% by weight of at least one first optional element selected from the group consisting of Mo, Ti, Zr, Nb and V, at least one second optional element selected from the group consisting of C and O, and the balance of Cu and inevitable impurities (Abstract, lines 1-8). In one preferred embodiment, "when the wear-resistant copper-based alloy is used to build-up by means of laser," the alloy further comprises at least one element selected from the group consisting of yttrium (Y), misch metal, and hafnium (Hf) in an amount of **0.01 to 0.1%** by weight. Col. 17, lines 49-53; Table 1; claims 10 and 19.

Kawasaki does not teach or suggest a wear-resistant copper-based alloy comprising **2.7 to 22.0%** tantalum and/or hafnium. Further, Kawasaki discloses that the presence of two or more of the elements selected from the group consisting of yttrium (Y), misch metal, and hafnium (Hf) in a total amount of **more than 0.1%** by

weight is **NOT** desirable because it is likely to result in decreased flowability of molten metal and excessive heating and too much dilution of the substrate. Col. 17, line 65 to col. 18, line 6. Thus, Kawasaki teaches away from the claimed invention. The disclosures of Kawasaki would discourage one of ordinary skill in the art from using more than 0.1% of hafnium (Hf) in the copper-based alloy of Kawasaki to achieve the claimed wear-resistant copper-based alloy.

On the other hand, applicants have found, surprisingly, that it is beneficial to have **2.7 to 22.0%** tantalum and/or hafnium in the claimed wear-resistant copper-based alloy to enhance the wear resistance and lubricity of the alloy at high temperatures. Pages 13-14, paragraph [0030]-[0031]. When the amount of tantalum and/or hafnium is below 2.7% by weight, the improving effects of tantalum and/or hafnium on the wear resistance are not sufficient, resulting in deterioration of the wear resistance of the copper-based alloy. Page 14, paragraph [0031]. The improvement in the wear resistance of the copper-based alloy achieved with **2.7 to 22.0%** tantalum and/or hafnium was unexpected. Kawasaki not only fails to disclose a copper-based alloy comprising **2.7 to 22.0%** tantalum and/or hafnium but also fails to teach that the amount of tantalum and/or hafnium would affect the wear resistance of the alloy.

For at least these reasons, the present invention would not have been obvious over Kawasaki. Withdrawal of the obviousness rejections of claims 11-12 and 15-19 is requested.

II. Applicants respectfully traverse the obviousness rejections under 35 U.S.C. 103(a) of claims 11 and 15-18 over JP 60110867.

JP 60110867 discloses Ag alloys with a boronized Mn layer containing 0.5-35% Mn, 0.5-35% Cu, 0.1-1% Cr, 0.1-10% Fe, 0.1-10% Ni, 0.1-10% Co, 0.1-5% Zn, 0.1-5% Cd, 0.1-3% one or more of Al, Ti, Zr, and Si as B-diffusion promoting agents, and the balance Ag (Abstract). JP 60110867 only discloses a silver-manganese alloy, which is very different from the copper-based alloy of the present application. Further, JP 60110867 does not teach or suggest an alloy comprising tantalum and/or hafnium, let alone 2.7 to 22.0% of tantalum and/or hafnium recited in instant claim 11. Because JP 60110867 does not teach or suggest each and every limitation of claim 11

(and the claims depended thereon), a *prima facie* case of obviousness has not been established. Withdrawal of the rejections is respectfully requested.

III. Applicants respectfully traverse the obviousness rejections under 35 U.S.C. 103(a) of claims 11-19 over EP 1361288 in view of Kawasaki.

As the Examiner acknowledged in page 5 of the Office Action, EP 1361288 does not disclose one of Ta, Ti, Zr, and/or Hf in the copper-based alloy. As discussed above, Kawasaki teaches away from using greater than 0.1% hafnium in the copper-based alloy and fails to teach or suggest the unexpected result of improving the wear resistance of the copper-based alloy achieved with **2.7 to 22.0%** tantalum and/or hafnium, as recited in claim 11.

For at least these reasons, the present invention would not have been obvious over EP 1361288 in view of Kawasaki. Withdrawal of the obviousness rejections of claims 11-12 and 15-19 is requested.

CONCLUSION

Applicants submit that the claims are allowable and an early and favorable action to that effect is respectfully requested.

The Examiner is invited to contact the undersigned to discuss any issues regarding this application.

In the event that the filing of this paper is deemed not timely, applicants petition for an appropriate extension of time. The Office is authorized to charge any underpayment or credit any overpayment to Kenyon & Kenyon LLP's Deposit Account No. 11-0600.

Respectfully submitted,

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